POS 58 Thermal Line Printer

User's Manual

Feb. 2000

Warning

No warranty will be provided for printer head damage, also for bad printing quality due to use of non-specified thermal paper.
No warranty will be provided if printer or control board has been disassembled or altered.

The contents of this manual are subject to change without notice.

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Introduction

POS58 is a new type of thermal line printer. Unlike impact printers it needs no ribbon cassette. The special features of this printer are small in size, high in printing speed and low in noise. It comes to represent first class printing quality and high reliability.

POS58 is easy to operate. It can be used in wide range of applications specially for ECR(Electronic Cash Register) and POS(Point Of Sales) system and various receipt printing.

Chapter 1 Features and Specifications

1.1 Printing Features

- Printing Method: Direct thermal line printing
- Printing Paper Width: 57.5+-0.5mm
- Printing Density: 8 dots/mm, 384 dots/line
- Printing Speed: 26mm/sec. or 7 lines/sec. Approx.
- Reliability:

Printing head: 2 x 10^6 character line
MCBF: 5 x 10^6 line
Under condition:
*Not more than 50 lines each time for non-continuous printing with ANK character size of 12 x 24
*Printing dots at same time per one dot line not more than 25% while vertical printing dots per one character line not more than 11 times.
*Using specified thermal paper

- Valid Printing Width: 48mm
- Line Feed Speed: 37.5mm/sec. Approx. or 10 lines/sec.

1.2 Printing Paper

- Thermal Paper Model: TF50KS-E (Japan Paper Co., Ltd.)
  AF50KS-E (JuJo Thermal)
- Thermal Paper Roll
  Paper Width: 57.5 +/-0.5mm
  OD: 50 mm (max.)
  ID: 13 mm (min)
  Thickness: 53~60g/m^2

1.3 Printing Character

- IBM Character set II
12x 24 dots, 1.25 mm(w) x 3.00 mm(h)

- GB Chinese Level 1 & 2
24 x 24 dots, 3.00 mm(w) x 3.00 mm(h)

1.4 Interface

- Serial
RS232C compatible, D-SUB 25 pin (female) connector, XON/XOFF or RTS/CTS handshaking.
Baud Rate: 9600 bps
Data transfer format: 1 Start Bit + 8 Data Bits + 1 Stop Bit
- Parallel
8-bit parallel, D-SUB 25 pin (male) connector, BUSY handshaking. paper-end detector.
- Cash Drawer
DC12V, 1A, 6-line RJ-11 connector.

1.5 Printing Commands

- Character Printing Commands
Support printing in double width, or/and double height for ANK character, user-defined character and Chinese character; and line space adjustment
- Graphic Printing Commands
Support various density graphics printing and down-load graphics printing

1.6 Power Supply

DC9 ~ 12v, 2A

1.7 Working Environment

Operating temperature: 5 ^{o} ~ 40^{o} C Relative humidity: 10 ~ 80%
Storage temperature: -20 ^{o} ~ 60 ^{o} C Relative humidity: 10 ~ 90%
While operating temperature is 34 ^{o} C, relative humidity <=80%; while operating temperature is 40 ^{o} C, relative humidity < =58 %

1.8 Models

TP POS58S	Serial Interface
TP POS58P	Parallel Interface

1.9 Weight

840G (without paper roll)

1.10 Dimension

116 (W) x 185 (L) x 140 (H) mm

Chapter 2 Installation and Operation

2.1 Appearance

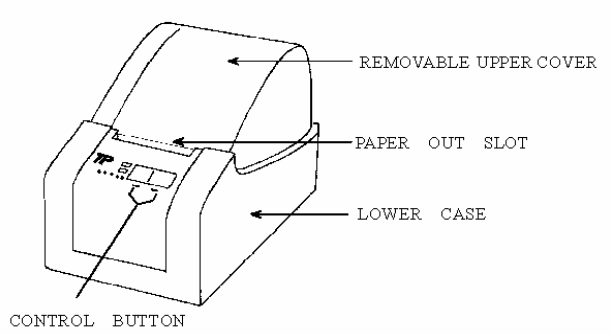
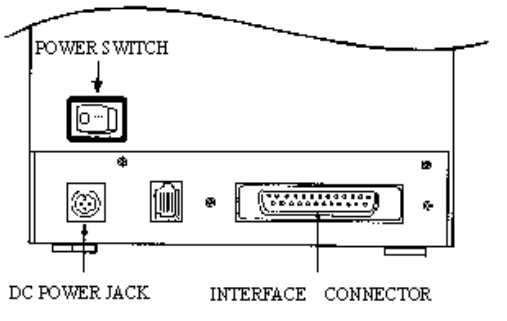


fig.2-1 Appearance



2.2 Control Panel

There are two buttons and two indicators on Panel of POS58 as below:

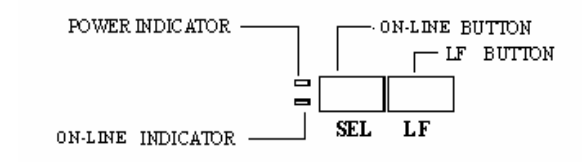


fig. 2-2 POS58 Control Panel

2.3 Connecting of Power Supply

Please use included power supply shown as follows:

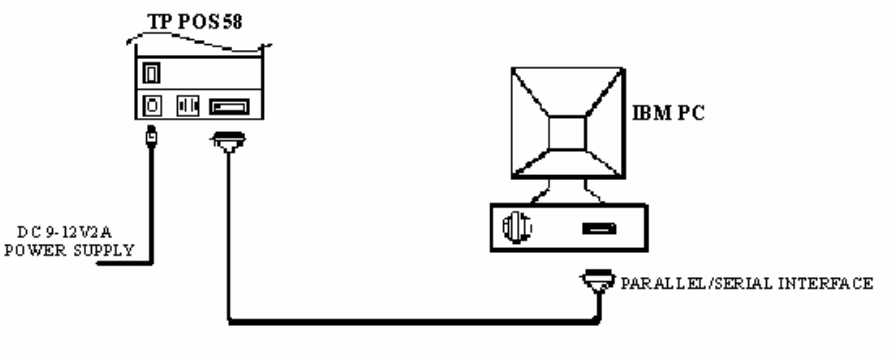


fig. 2-3 POS58 System Installation

Caution:

1. Connecting the output plug of the power supply cable to POS58 first before plug the power supply cord into AC Main to avoid power supply output plug damage.
2. Using of improper type of power supply will cause printer damage.
3. Paper will be moved forward a little further automatically after power on. If no paper is loaded indicator will flash.

2.4 Loading Paper

(1) Open the removable upper cover of printer, place thermal paper roll on the paper holder.
(2) Insert the paper end deep-down into the paper-in slot of the printer mechanism.
(3) Turn power on, press <LF> key under off-line status, paper will be automatically moved upwards to the paper-out slot on top of printer mechanism.
(4) Pull the paper out through paper-out slot on the upper cover and then close the cover.
(5) Press <LF> button to feed paper to the proper position.

Suggestion:

Power off before loading paper for easy installation and protecting printing mechanism.

Caution:
1. Do not press <LF> button while no paper in printer mechanism.
2. Do not pull paper forward or backward by hand. Press <LF> for paper release.

2.5 Connecting of Interface

2.5.1 Connecting of Serial Interface

Serial interface of POS58 is compatible with RS232C which support RTS/CTS and XON/XOFF handshaking. Use a D-Sub 25 pin (female) socket. Pin order of serial port is as follows:

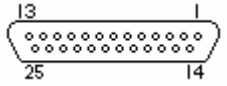


fig.2-4 Pin order of serial port

Pin Assignment of Serial Port

Pin No.	Signal	Source	Description
3	RXD	Host	Printer receives data from host.
2	TXD	Printer	Printer send control code XON/XOFF to host while in use of handshaking of XON/XOFF
4	RTS	Printer	There are two states of this signal, "Mark" and "Space". "Mark" indicates that the printer is busy and unable to receive data; "Space" indicates that printer is ready to receive data.
7	GND	-----	Signal ground

Note: 1. "Source" represents signal source
2. Signal level is +/- 3V to +/-15V

fig. 2-5 Pin Assignment of Serial Port

Default setting of baud rate is 9600 bps, 8 data bit, 1 or more stop bit and none parity bit. Serial port can be connected with standard RS232C , such as IBM PC or compatible PC which is listed as follows:

Printer DB-25 Socket, IBM PC Serial Port DB-9
Printer DB-25 Socket, IBM PC Serial Port DB-25

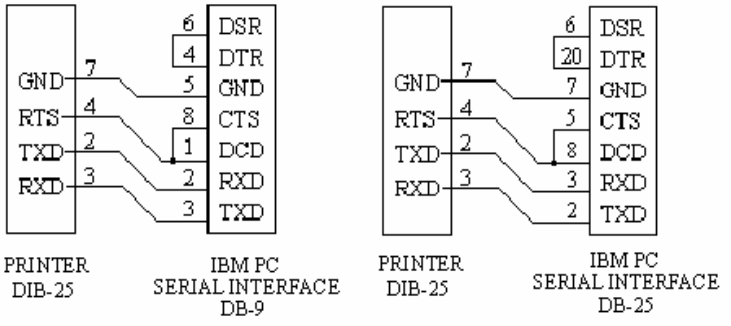


fig. 2-6 Connection between POS58 and IBM PC serial ports

2.5.2 Connecting of Parallel Interface

Parallel port of POS58 is 8-bit interface which support BUSY handshaking. Using a D-Sub 25 pin (male) socket. Pin order of parallel port is as follows:

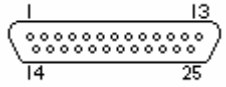


fig.2-7 Pin order of parallel port

Pin Assignment of Parallel Port as follows:

Pin No.	Signal	I/O	Description
1	/STB	In	Strobe pulse, to latch data. Reading occurs at falling edge

2	DATA 1	In	These signals represent the 1st bit to 8th bit of the parallel data respectively. Each signal is at HIGH level when data is logical 1 and LOW when data is logical 0.
3	DATA 2	In	
4	DATA 3	In	
5	DATA 4	In	
6	DATA 5	In	
7	DATA 6	In	
8	DATA 7	In	
9	DATA 8	In	
10	/ACK	Out	Pull up to HIGH logical level by a resistor.
11	BUSY	Out	HIGH level signal indicates that the printer is BUSY and can not receive data.
12	PE	Out	HIGH level signal indicates that paper running out.
13	SEL	Out	Pull up to HIGH logical level by a resistor.
15	/ERR	Out	Pull up to HIGH logical level by a resistor.
14,16,17	NC	---	No connection
18-25	GND	---	Grounding, logical "0" level

Notes:
1. "In" represents input to printer, "Out" represents output from printer
2. signal level is TTL standard.

fig.2-8 Pin Assignment of Parallel Port

The timing chart for handshaking signals in parallel port is as follows:

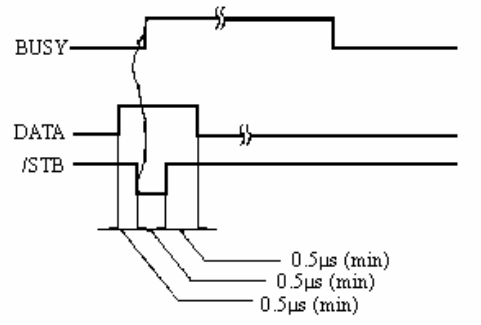


fig. 2-9 Signal timing chart of parallel port

2.5.3 Connecting of Cash Drawer

POS58 adopts RJ-11 6-line type cord with required power supply (VH) DC12V.

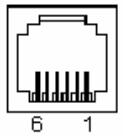


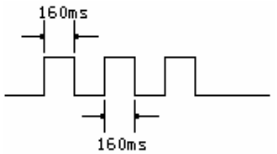
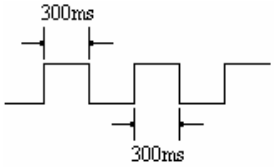
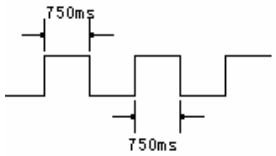
Fig.2-10 Cash drawer connection

Pin Assignment Definition:

Pin No.	Signal	Direction
1	structure grand	------
2	cash-drawer driver signal	out
3	cash-drawer on/off status	in
4	+12V DC	out
5	N.C.	-----
6	cash-drawer on/off signal grand	-----

2.6 Indicator and Function Key

There are two buttons and indicators on the panel of POS58, the Red one is Power indicator and Green one is status indicator. While Green indicator in light this means printer is in ON-LINE mode, otherwise in OFF-LINE mode. Green indicator flashing stands for warning signal.

Situation	timely flashing	explanation
Paper out		Paper out. Printer in "offline" status, Green indicator flashing waiting for paper feed.
Printhead overheat		Printer will be back to normal automatically, after printhead temperature cooling down to 45°C.
Thermal resistor of printer mechanism fault		Unrecoverable. Turn off power for inspection. Cable connection problem usually.

There are two push buttons - <LF> line feed and <SEL> on line . Functions of these buttons can be set to enabled or disabled by printing commands. In enabled status functions of these two buttons are listed as follows:
- On-line/Off-line method:
Indicator Green lights under on-line status, press <SEL> once, the indicator Green darks under off-line status, printer stop receiving data from host. Press <SEL> again, resume on-line status.

- Paper feed methods:
Press <LF> (Line Feed) Button while off-line, starting paper feeding; release it, stop paper feeding.
- Self test method:
Hold down <SEL> button and turn on power, when paper feeding start, release the button, self-test print out automatically.
- Hexadecimal printing method:
Hold down <LF> button and turn power on into hexadecimal printing mode. Printer will print out all received data in hexadecimal format regardless of command code or ASCII code.

2.7 Self-test

Self-test checks condition of printer. If the printer prints out the Self-test sample correctly it is working normally. Self-test will print out in order of software version interface and 128 ANK characters.
To start Self-test, press and hold down <SEL> button while power on, when paper starts to move forward release the button, then Self-test sample will be printed.

Chapter 3 Printing Commands

3.1 Summary

POS58 provides ESC/POS compatible commands. Each command is described in following format:

Printing command Function

Format: ASCII: the standard ASCII characters sequence
Decimal: the decimal numbers sequence
Hexadecimal: the hexadecimal numbers sequence

Explanation: What the command does and how to use it.
Example: Some program examples are listed to illustrate the commands for better understanding.

3.2 Commands

3.2.1 Printing Commands

LF — Print & Paper Feed

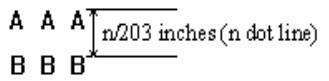
Format :	ASCII:	LF	
	Decimal:	10	
	Hexadecimal:	0A	

Explanation:
Print data in buffer of the printer and feed one line forward. Feed one line forward only if no data in buffer of the printer.

ESC J — Print & 'n' Dot Line Feed

Format:	ASCII:	ESC	J	n
	Decimal:	27	74	n
	Hexadecimal:	1B	4A	n

Explanation:
print data in buffer of the printer and feed 'n' -dot line forward. (n/203 inches). The value of n is between 0 ~ 255.
This command is valid for the current line only and line space settings (set by ESC 2 & ESC 3.) remains unchanged.
Example:



3.2.2 Line Space Setting Commands

ESC 2 — Set Character Line Spacing to 1/6 Inches

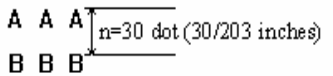
Format :	ASCII:	ESC	2
	Decimal:	27	51
	Hexadecimal:	1B	33

Explanation:
The line spacing is set to 1/6 inch.

ESC 3 — Set Line Spacing to n-dot (n/203 inches)

Format:	ASCII:	ESC	3	n
	Decimal:	27	51	n
	Hexadecimal:	1B	33	n

Explanation:
The line spacing is set to n dot-lines. The value of n can be any number in the range 0~ 255. One dot-lines is 1/203 inch for POS 58. Default setting n= 30.
Example:



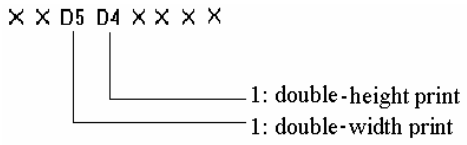
3.2.3 Character Setting Commands

ESC ! — Set Character Print Mode

Format :	ASCII:	ESC	!	n
	Decimal:	27	33	n
	Hexadecimal:	1B	21	n

Explanation:

ESC ! n is a compound command to set character printing mode. This is used to set character printing size. Each bit of parameter n is defined as follows:



Default value n =0, normal character size.

ESC SO — Set Double-width Character Printing

Format:	ASCII:	ESC	SO
	Decimal:	27	14
	Hexadecimal:	1B	0E

Explanation:
All characters after ESC SO within one line will be printed out in double-width.
For cancellation use DC4 or return key.

ESC DC4 — Cancel Double-width Character Printing

Format:	ASCII:	ESC	DC4
	Decimal:	27	20
	Hexadecimal:	1B	14

Explanation:
Resume normal printing.

ESC % — Enable/Disable User-defined Character

Format :	ASCII:	ESC	%	n
	Decimal:	27	37	n
	Hexadecimal:	1B	25	n

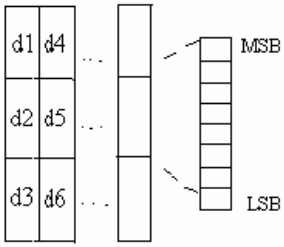
Explanation:
n=1, for enable user-defined character set; n=0 for internal character set. Default value n=0.

ESC & — Define User-defined Characters

Format:	ASCII:	ESC	&	S n m [a [p]$_{(S \times a)}$]$_{(m-n+1)}$
	Decimal:	27	38	S n m [a [p]$_{(S \times a)}$]$_{(m-n+1)}$
	Hexadecimal:	1B	26	S n m [a [p]$_{(S \times a)}$]$_{(m-n+1)}$

Explanation:
ESC & is used to define user-defined characters. This command is powerful and complicated. S=3, 32<=n<=m<=126, 0<=a<=12, 0<=p<=225.

s is number of vertical bytes. Default value S=3.
n is starting ASCII code for user-defined character.
m is ending ASCII code for user-defined character.
when define one character only, m=n, maximum number of user-defined characters is 96.
a is the number of the horizontal dots.
p is the data byte of user-defined character, each character contains s×a bytes, total number of user-defined characters is m-n+1.
User-defined characters remain unchanged till redefining or printer turning off.
The User-defined Character's Bitmap Data as follows:



3.2.4 Special Control Commands

ESC c 5 — On/off Switch Button Function

Format :	ASCII:	ESC	c	5	n
	Decimal:	27	99	53	n
	Hexadecimal:	1B	63	35	n

Explanation:
n=1 <SEL> & <LF> buttons functional, while n=0 <SEL> & <LF> buttons non-function.
Default value n=1.

3.2.5 Graphic Printing Commands

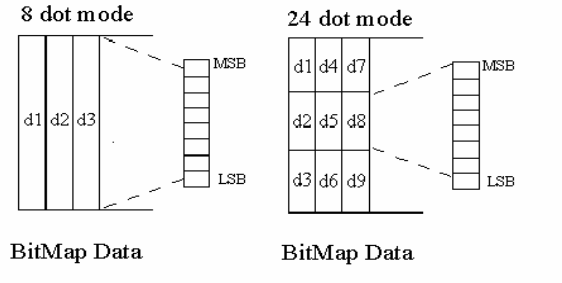
ESC * — Set Bit-Map Graphics Printing

Format:	ASCII:	ESC	*	m	n1	n2	[d]k
	Decimal:	27	42	m	n1	n2	[d]k
	Hexadecimal:	1B	2A	m	n1	n2	[d]k

Explanation:
m for setting bit-map graphics mode; n1 n2 for setting number of dots; [d]k for setting content of dots. m=0, 1, 32, 33.; n1=0~255, n2=0~3; d=0~255;
k=n1 +256 x n2 (m=0,1); k=(n1+256 x n2) x 3 (m=32,33)

- Horizontal dots is n1+256 x n2
- If the number of dot is more than one line, the extra portion will be ignored. (refer to following table)
- d is data byte of the bit-map graphics. For 1 of bit means the related dot will be printed and for 0 of bit means the dot not printed. (k for number of data bytes)
- m for selection of bit-map graphics mode.

M	**Mode**	**dot**	**Vertical dot density**	**Horizontal dot density**	**max.dot**
0	8-dot single density	8	68DPI	101DPI	192
1	8-dot double density	8	68DPI	203DPI	384
32	24-dot single density	24	203DPI	101DPI	192
33	24-dot double density	24	203DPI	203DPI	384



GS/ — Print Down-load Bit Map Graphics

Format :	ASCII:	GS	/	n
	Decimal:	29	47	n
	Hexadecimal:	1D	2F	n

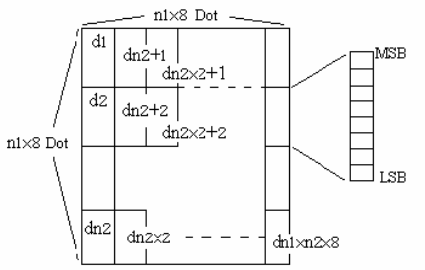
Explanation:
This command prints out the down-load bit-map graphics. n=0~3.
n for selection printing mode of the bit-map graphics.
To define the down-load bit-map graphics using "GS*" command:

n	**Bit-map mode**	**Vertical dot density**	**horizontal dot density**
0	normal	203DPI	203DPI
1	double width	203DPI	101DPI
2	double height	101DPI	203DPI
3	double height & width	101DPI	101DPI

GS * Set Down-load Bit-Map Graphics

Format:
ASCII:	GS	*	n_1 n_2 $[d]_k$
Decimal:	29	42	n_1 n_2 $[d]_k$
Hexadecimal:	1D	2A	n_1 n_2 [d]k

Explanation:
This command for set of down-load bit-map graphics.
n1=1~48, n2=1~255, n1x n2<1200, k=n1x n2 x 8
d is data byte of the down-load bit-map graphics.
horizontal n1 x 8 dots, vertical n2 x 8 dots.
Setting of down-load bit-map graphics remain valid till new definition or power off.



3.2.6 Other Commands

ESC @ Initialize Printer

Format:
ASCII:	ESC	@
Decimal:	27	64
Hexadecimal:	1B	40

Explanation:
This command initializes printer in following aspects:
- clear data in printing buffer;
- reinstate default value;
- select character printing mode;
- clear user-defined characters.

ESC p Control Cash Drawer

Format :
ASCII:	ESC	p	m	n_1 n_2
Decimal:	27	112	m	n_1 n_2
Hexadecimal:	1B	70	m	n_1 n_2

Explanation:
This command is to generate a pulse to trigger the opening of the cash drawer.
n_1 and n_2 define the duration of the trigger pulse.
m=0, $0 < n_1 <= n_2 <= 255$.
n_1 x 2ms is the pulse width in high level for opening of drawer. n2 x 2ms is the pulse width in low level for closing of drawer.

ESC v Send Printer Status To Host

Format
ASCII:	ESC	v
Decimal:	27	118
Hexadecimal:	1B	76

Explanation:
This function only valid to printer with RS232 interface. When printer receive the command, it transfers one byte through TXD line of the interface. Definition of said byte is as follows:

Digit	**Function**	**Value**	
		0	1
0	not defined	----------	----------
1	not defined	----------	----------
2	paper test	with paper	without paper
3	not defined	----------	----------
4	not in use	0	0
5	not defined	----------	----------
6	not defined	----------	----------
7	not defined	----------	----------

ESC u Send Equipment Status To Host

Format	ASCII:	ESC	u	n
	Decimal:	27	117	n
	Hexadecimal:	1B	75	n

Explanation:
This function only valid to printer with RS232 interface. Default value n=0.
When printer receive the command, it transfers one byte through TXD line of the interface. Definition of said byte is as follows:

Bit	**Function**	**Value**	
		0	1
0	Cash Drawer on/off Pin	low	high
1	not defined	----------	----------
2	not defined	----------	----------
3	not defined	----------	----------
4	not in use	0	----------
5	not defined	----------	----------
6	not defined	----------	----------
7	not defined	----------	----------

Appendix 1 Specifications

- Printing Method: Direct thermal printing
- Paper Width: 57.5+/-0.5mm
- Printing Width: 48 mm
- Printing Density: 8 dots/mm, 384 dots/line
- Printing Speed: approx. 26mm/sec. 7 lines/sec

- Reliability:
Printing head: 2 x 10^6 character line
MCBF: 5 x 10^6 line
Under condition:
*Not more than 50 lines each time for non-continuous printing with ANK character size of 12 x 24
*Printing dots at same time per one dot line not more than 25% while vertical printing dots per one character line not more than 11 times.
*Using specified thermal paper

- Thermal Paper Model: TF50KS-E (Japan Paper Co., Ltd.)
AF50KS-E (JuJo Thermal)
- Thermal Paper Roll
Paper Width: 57.5 +/-0.5mm
OD: 50 mm (max.)
ID: 13 mm (min.)
Thickness: 53~60g/m^2

-Printing Character
IBM Character set II
12 x 24 dots, 1.25 mm(w) x 3.00 mm(h)

GB Chinese Level 1 & 2
24 x 24 dots, 3.00 mm(w) x 3.00 mm(h)

- Serial Interface
RS232C compatible, D-SUB 25 pin (female) connector, XON/XOFF or RTS/CTS handshaking.
Baud Rate: 9600 bps
Data transfer format: 1 Start Bit + 8 Data Bits + 1 Stop Bit

- Parallel Interface
8-bit parallel, D-SUB 25 pin (male) connector, BUSY handshaking. paper-end detector.

- Cash Drawer Interface
DC12V, 1A, 6-line RJ-11 connector.

- Power Supply: 9-12v, 2A

- Working Environment:
Operating temperature: 5 ° ~ 40° C Relative humidity: 10 ~ 80%
Storage temperature: -20 ° ~ 60 ° C Relative humidity: 10 - 90%
While operating temperature is 34 ° C, relative humidity <=80%; while operating temperature is 40 ° C, relative humidity < =58 %

Appendix 2 Index of Printing Command

Quick reference	Command	Description	Page No.
Printing command	LF	Print & Line feed	15
	ESC J	Print & n dot line feed	15
Line space command	ESC 2	Set line space at 1/6 inches	16
	ESC 3	Set line space to n dot (n/137 inches)	16
Character printing command	ESC !	Set character print mode	16
	ESC S0	Enable character double-width print	17
	ESC DC 4	Disable character double-width print	17
	ESC %	On/off user-defined characters	17
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Special control command	ESC c 5	On/off Push button function	19
Graph printing command	ESC *	Set bit-map graphics	19
	GS*	Set down-load bit-map graphics	21
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Other command	ESC @	Initialize printer	21
	ESC p	Control cash drawer	22
	ESC v	Send printer status to Host	22
	ESC u	Send equipment status to Host	23

Appendix 3 Index of Printing Character

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
2		!	"	#	$	%	&	'	(	)	*	+	,	–	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
8	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
9	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	¢	£	¥	₧	ƒ